Potato Wart
Synchytricum endobioticum

The fungal pathogen *Synchytrium endobioticum* causes potato wart disease. The disease was originally discovered in the Andean region of South America during the latter part of the 19th century. It continued to spread into parts of North America and Europe with the movement of seed tubers, infected soil, machinery and implements used in cultivation, footwear, and manure from animals. Other Solanaceous crops may be hosts for the disease. However, it appears that potatoes are mainly affected by the pathogen.

When the conditions are favorable, the disease is highly infectious, appearing mainly on stolons and tubers. Underground development of wart-like growths on the tubers makes it difficult to detect, as signs and symptoms may not be apparent during the growing season. The warts are often knocked off of the tubers during harvest, adding to the difficulty in detection. The fungal spores can live in the soil for decades.

This fungal pathogen is considered a quarantine significant pest internationally due to its destructive nature and longevity within the soil. Montana is a key seed potato growing region within the United States, producing both seed potatoes for interstate trade and table-stock potatoes for international trade. It is essential to ensure that our potato growing areas are free from this pathogen.

Central Science Laboratory, Harpenden Archives, British Crown, www.forestryimages.org

Potato wart infested tubers.

The Montana Department of Agriculture collected 150 soil samples for laboratory analysis to detect the presence of *S. endobioticum* within potato growing fields. The samples were obtained from major geographical regions where seed and commercial potatoes are grown within the State. Potato wart has is not been known to occur in Montana. Monitoring for the pathogen will provide growers with confidence and assure their trading partners that Montana's fields are free from this disease.

2006 Potato Wart Sample Results

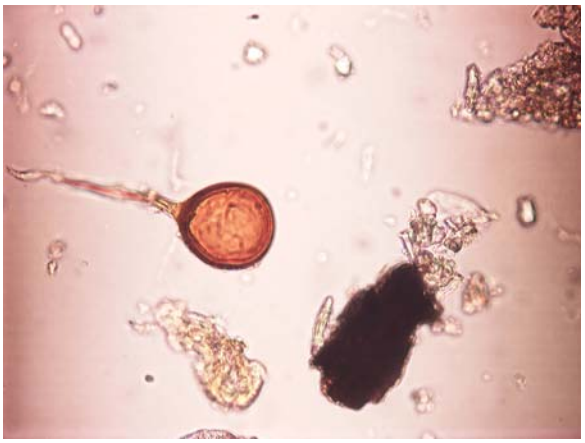
County	Samples Collected	Results
Beaverhead	24	Negative
Broadwater	18	Negative
Flathead	9	Negative
Gallatin	69	Negative
Lake	27	Negative
Madison	3	Negative

The Schutter Diagnostic Lab processed 150 soil samples and visually assayed all samples for potato wart sporangia. We did not observe *Sychytrium endobioticum* sporangia in any of the samples. Through consultation with MSU mycologist Dr. Cathy Cripps, we developed a list of criteria from which to identify *Synchtrium* sporagia. They are:

1. Golden color
2. Size 25-75µl (already controlled by sieve size)
3. Round but slightly irregular shape
4. Tri-layered wall
5. Presence of reticulations on cell wall
6. Presence of host tissue surrounding sporangia

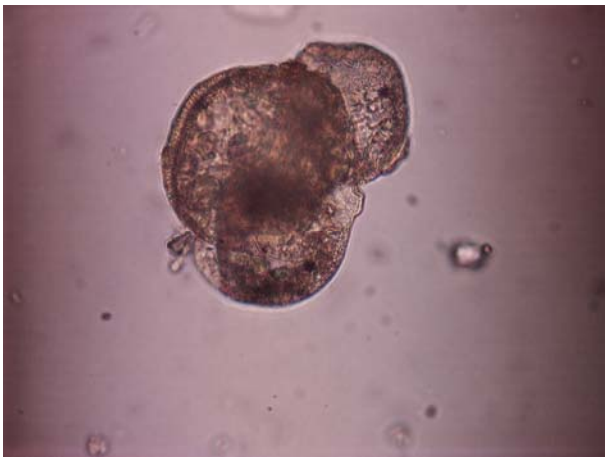
There were a number of sporangia-like organisms in the soil. Using the list of criteria above, and the expert advice of Dr. Cripps, we determined that they were not *Synchytrium endobioticum* sporangia. Some of the structures that we observed at 400X magnification were:

No reticulations, too perfectly round, two cell walls

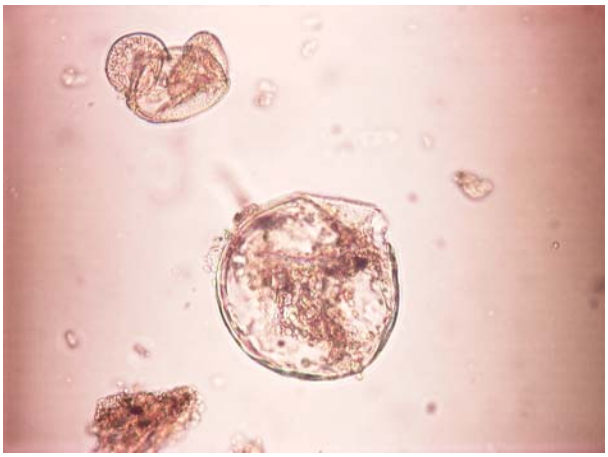


Looks similar to an arbuscular mycorrhizae spore. *Synchytrium* sporangia would not have the subtending hyphae extending out of the structure.

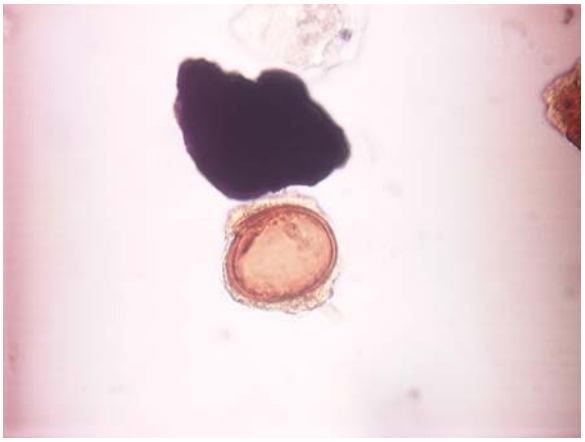
Too dark, and too perfectly round.



Pollen.

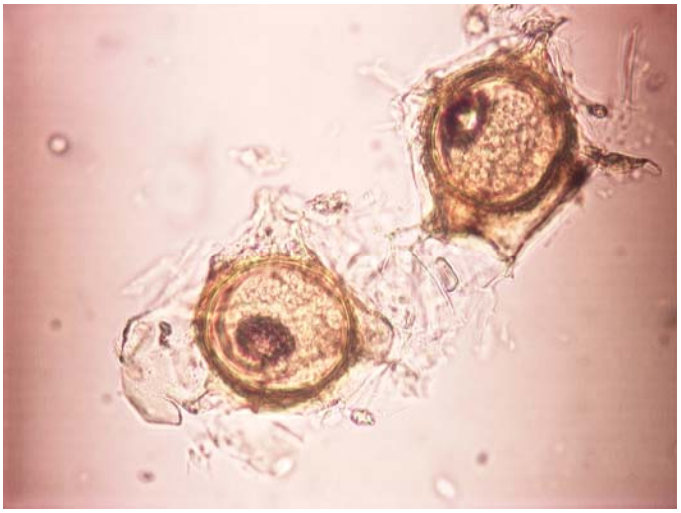


Single, very thin wall



No reticulations, single cell wall

The above structures were compared to slides of de-vitalized sporangia (below) which were obtained from Dr. Mary Palm Senior Mycologist and Lab Director, PPQ Molecular Diagnostic Lab, APHIS PPQ, Beltsville, MD.



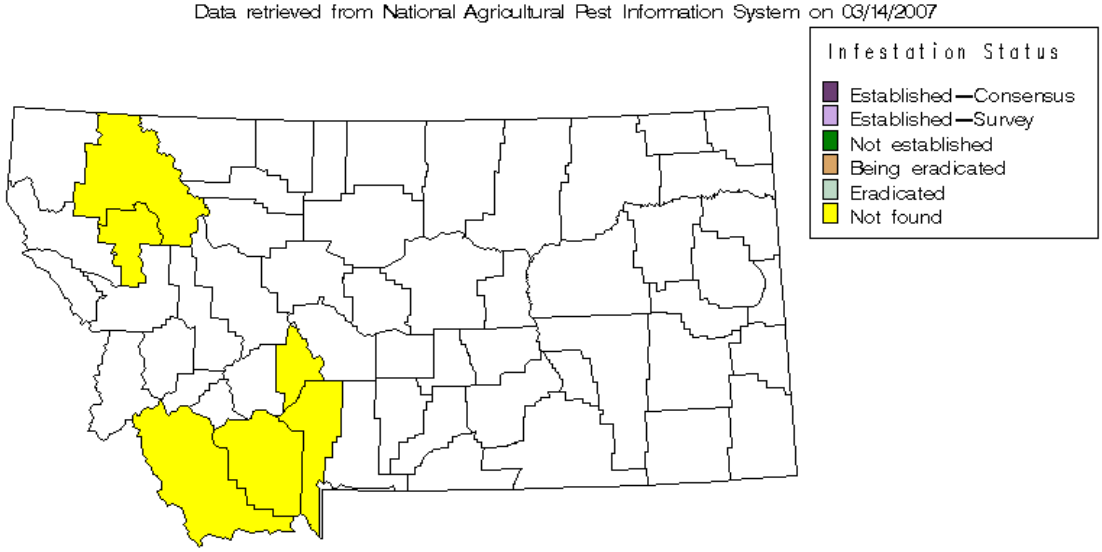
Sporangia of *Synchytrium endobioticum*

Reported Status of

POTATO WART , SYNCHYTRIUM ENDOBIOTICUM

in MONTANA

Data retrieved from National Agricultural Pest Information System on 03/14/2007



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Negative data spans over last 3 years only.

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Area-Wide Nematode Survey

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Internal damage to tuber caused by Ditylenchus destructor.

Many species of nematodes cause significant reductions in crop yields, impacting the growth of many different crops. The nematodes surveyed for are of regulatory significance and would negatively impact our agricultural export markets, if detected.

The MDA collected 111 soil samples throughout Dawson, Rosebud, Carbon, Beaverhead, Broadwater, Cascade, Lewis and Clark, Big Horn, Daniels, Hill, Judith Basin, Madison, Sanders, Fergus, Flathead, Lake, Gallatin, Pondera, Richland, Treasure and Yellowstone counties. Crops sampled included: alfalfa, barley, beans, garlic, lentils, nursery stock, potatoes, peas, safflower, and wheat.

Soil was screened for thirty five nematodes species, sixteen species of regulatory concern, and nineteen other plant-parasitic genera, including: *Globodera rostochiensis*, *Globodera pallida*, *Ditylenchus destructor*, *Ditylenchus dipsaci*, *Meloidogyne chitwoodii*, *Meloidogyne falax*, *Meloidogyne hapla*, *Meloidogyne javanica*, *Meloidogyne artiellia*, *Nacobbus aberrans*, *Paratrichodorus* species, *Heterodera glycines*, *Xiphinema bakeri*, *X. diversicaudatum*, *X. coxi* (syn *X. europaeum*), and *Rotylenchus reniformis*.

Results from the survey will benefit Montana growers by providing information on the identified species of nematodes that currently reside within their farmlands. The information gleaned from the survey will provide the growers with current nematode population levels, so control methods can be implemented, reducing damage to their crop yields in the future.

Bonsak Hammeraas, Norwegian Institute for Agricultural and Environmental Research, www.ipmimages.org

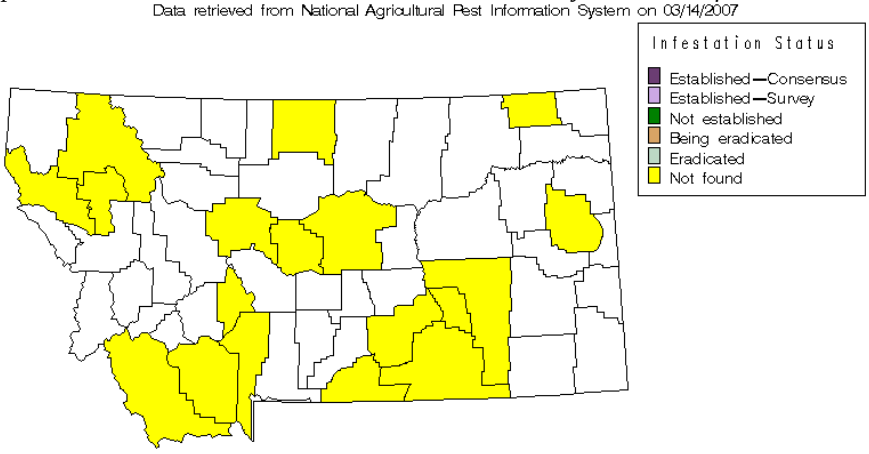
White potato cyst nematode, *Globodera pallida.*

2006 Nematode Survey Results

County	Samples Collected	Results
Beaverhead	8	Negative
Big Horn	7	Negative
Broadwater	6	Negative
Cascade	1	Negative
Carbon	16	Negative
Daniels	10	Negative
Dawson	4	Negative
Fergus	3	Negative
Flathead	3	Negative
Gallatin	23	Negative
Hill	3	Negative
Judith Basin	1	Negative
Lake	9	Negative
Lewis and Clark	1	Negative
Madison	1	Negative
Rosebud	2	Negative
Sanders	2	Negative
Treasure	2	Negative
Yellowstone	8	Negative

Reported status of *Globodera rostochiensis*, *G. pallida*, *Ditylenchus destructor*, *D. dipsaci*, *Meloidogyne chitwoodii*, *M. falax*, *M. hapla*, *M. javanica*, *M. artiellia*, *Nacobbus aberrans*, *Paratrichodorus* species, *Heterodera glycines*, *Xiphinema bakeri*, *X. diversicaudatum*, *X. coxi*, and *Rotylenchus reniformis* for Montana

Data retrieved from National Agricultural Pest Information System on 03/14/2007



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